Review of: "Modeling the structure and evolution of cultural information as Quasispecies"

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I received an email alert suggesting I might be interested in reviewing this work, and indeed I was. I was also intrigued by the peer-review model, so was also interested to try that out as well.

Overall, this is a thoughtful piece of work that provides a convincing justification for viewing cultural information as a quasispecies. A strength of the work is the attempt to quantify and utilise mutation rates for cultural evolution, and exploring the consequences of this through a formal model. I feel that this is a worthwhile observation to the field, worthy of further investigation. As other reviewers have noted, this contribution is though-provoking on that basis.

I do also think there are some weaknesses in the presentation that the author could bear in mind for the future. I felt that the author made some fairly strident claims in the introduction, for example, in asserting the untruth of Caldière et al's position by declaring the contrary position by saying that the information has reproduced, but not in what sense it has reproduced. Either here one needs to draw on the wider literature (one might want to look at David Hull's generalised analysis of selection, for example) or perform original work to demonstrate that this the case. Similarly, the claim "in every sense the flow of cultural information is analogous to that observed in biological evolution" probably requires at least a book's worth of argumentation to justifiy it. The word "analagous" hides a lot of the complexity and subtlety of the parallels here. I would suggest simply being less strident - it did not seem to me that setting the work up in opposition to specific claims is fundamentally important to motivate it. It is perfectly valid to explore the question of what kind of evolution is cultural evolution, and the rest of the work does a nice job of this.

More specific points:

- I was unclear of the argumentation around Eq (1). Doesn't this imply that the lexicon size should ever decrease to zero over time? Also are you sure the pre-factor on the right-hand side is 1? This would suggest that every lexicon is smaller than one word, which feels a bit wrong somehow.
- Again I did not follow the discussion around eqs (2) and (3). Partly this is because not all the symbols were defined, and even when they were I was not sure what was meant (e.g, "scaling constant" - what is scaling here?). And partly because you do not really pursue this line of thinking: dead-ends are best avoided in my opinion.
- In Eq (13), where do the magic numbers like 0.5772 and 1.781 come from? Generally we avoid the appearance of such numbers and leave them in terms of underlying fundamental quantities - this gives the reader a better intuition for the conceptual content of the mathematics.

- I wasn't so keen on the separation of results and discussion. In general I find it easier to read when the discussion of the "here and now" arising from the specific results obtained is presented in-situ. Otherwise working memory tends to become overloaded. The discussion that was presented is good, and the separation of the broader outlook into a separation section is appropriate.

- One thing I would drop is the assertion that this is a "far-reaching article" - this is for the reader, not the author, to decide.

- Finally, implications around AI and connections to music came out of nowhere. Typically in a conclusion one would expect some connection to the framing and motivation presented in the introduction. Two possible routes forward are to expand the introduction so that the conclusion follows more naturally from it, or to cut back the conclusion so it more directly addresses the points raised in the introduction.

- The conclusion seems to touch on optimal/efficient communnication (sometimes couched as an expressivity-compressabiity trade-off). This has been discussed for example by Terry Regier and Simon Kirby and their respective collaborators and one can find relevant works eg via Google Scholar.